

SOME CRETACEOUS AND TERTIARY MICROFOSSILS
FROM WESTERN AUSTRALIA

By ISABEL C. COOKSON* and A. EISENACK§

*University of Melbourne; §University of Tübingen

[Read 14 December 1961]

Abstract

4 new genera and 10 new species of microfossils of uncertain affinity from Australian Cretaceous and Eocene sediments are described.

Introduction

During the course of a palynological examination of Cretaceous sediments in Western Australia a number of small microfossils of unknown nature and affinity have been found. Although it has not been possible to place these fossils taxonomically or even to throw light on their origin and significance, they are interesting in themselves and for this reason are deemed worthy of record and description. A few of them may have been, as Churchill (1960) has suggested for one of the forms to be mentioned herein, the aplanospores of Algae but others almost certainly do not fall into this category.

The deposits in which the microfossils occur were subjected to Schulze's solution after a pre-treatment with hydrofluoric acid and subsequently to alkali. It is evident, therefore, that the composition of the walls of the microfossils in question must have been very similar to that of the fossil dinoflagellates, hystrichospheres, microspores and cuticles with which they are associated.

The figured specimens are in the palaeontological collection of the National Museum of Victoria. Numbers prefaced by the letter P are registered numbers in that collection.

Systematic Descriptions

[INCERTAE SEDIS]

Genus *Lecaniella* gen. nov.

DESCRIPTION: Shell roughly saucer-shaped, one-layered, variously patterned on the outer surface.

TYPE SPECIES: *Lecaniella margostriata* sp. nov.

Lecaniella margostriata sp. nov.

(Pl. XXXVII, fig. 16, 17; holotype fig. 16; P21291)

AGE AND OCCURRENCE: Probably Albian: Power House Bore, near Perth, W.A. at 478 ft. ?Upper Albian-Cenomanian: Fremantle, W.A. Traffic Bridge No. 5 Bore at 100 ft.

DESCRIPTION: Shell small, rather deeply saucer-shaped, relatively thick-walled, the outer surface delimited by the sculptural pattern into a central and marginal zone. The central zone is ornamented with a shallow, wide-meshed reticulum the

muri of which are straight or wavy, evenly or unevenly thickened and, occasionally, incomplete. The marginal zone is characterized by the development of closely arranged radial thickenings which extend from the limits of the central zone to the rim of the shell.

DIMENSIONS: Holotype—diameter *c.* 42 μ . Range—diameter 30-42 μ .

Lecaniella dictyota sp. nov.

(Pl. XXXVII, fig. 18-20; holotype fig. 18; P21457)

AGE AND OCCURRENCE: ?Albian-Aptian: Jandakot Bore, near Perth, W.A. at 450 ft; Rakich's Bore, Caversham near Perth, at 350-355 ft. Probably Albian: Power House Bore, Perth at 478 ft. ?Upper Albian-Cenomanian: Attadale Bore, near Perth at 354 ft; Fremantle Traffic Bridge No. 5 Bore at 100 ft; Subiaco Bore (Light sample) at 358 ft.

DESCRIPTION: Shell rather flat, relatively large, the greater portion of the surface ornamented with a shallow reticulum the small to large meshes of which are polygonal in shape and the muri smooth straight or curved. At the rim the muri of adjoining meshes are radially directed so that the enclosed meshes are approximately rectangular in shape and collectively give the appearance of a marginal 'layer'.

DIMENSIONS: Holotype—diameter 82 μ . Range—diameter 62-90 μ .

COMMENTS: In one preparation, two examples of *S. dictyota* are lying in close juxtaposition to one another as if they were the two halves of one individual. This suggestion is further enhanced by the fact that the patterned surface of one 'half' is best seen at high focus, in the other at low focus. Moreover, the two specimens are of the same size and have the same type of pattern.

Such an idea would be conformable with the mode of opening by median split in some Chlorophyceae, e.g. *Phacotus*.

Genus *Schizocystia* gen. nov.

DESCRIPTION: Shell with almost straight to deeply convex sides without appendages or horns, separating into two approximately equal halves along a straight line. Surface of shell patterned or otherwise.

TYPE SPECIES: *Schizocystia rugosa* sp. nov.

Schizocystia rugosa sp. nov.

(Pl. XXXVII, fig. 11, 12; holotype fig. 11; P21465)

AGE AND OCCURRENCE: ?Upper Albian-Cenomanian: Fremantle Traffic Bridge Bore No. 5 at 100 ft.

DESCRIPTION: Sides of shell deeply concave, wall 3-4 μ thick with strongly marked wavy ridges that run transversely or obliquely across the surface.

DIMENSIONS: Holotype—72 μ long, 52 μ broad, width in middle 38 μ . Paratype (fig. 12)—width 58 μ .

Schizocystia laevigata sp. nov.

(Pl. XXXVII, fig. 13, 14; holotype fig. 13; P21466)

AGE AND OCCURRENCE: ?Upper Albian-Cenomanian: Subiaco Bore, Perth, W.A. at 358 ft (dark sample).

DESCRIPTION: Shell with slightly to deeply concave sides, walls *c.* 3 μ thick with a low and lightly indicated vermiculate pattern.

DIMENSIONS: Holotype—42 x 56 μ . Paratype (fig. 14)—width 83 μ , median length 57 μ .

COMMENTS: We have no evidence, other than general appearance, that the two specimens shown in Pl. XXXVII, fig. 13, 14 are complete and incomplete examples of one species. However, the centrally placed slit in the complete specimen (fig. 14) is very suggestive.

Halophoridia gen. nov.

DESCRIPTION: Shell disc-shaped, partially filled with a roughly hour-glass-shaped capsule. Wall of shell thin and delicate; wall of capsule untabulated.

TYPE SPECIES: *Halophoridia xena* sp. nov.

Halophoridia xena sp. nov.

(Pl. XXXVII, fig. 6-8; holotype fig. 6; P21463)

AGE AND OCCURRENCE: Probably Albian: Power House Bore at 478 ft. ?Upper Albian-Cenomanian: Fremantle Traffic Bridge Bore No. 5 at 100 ft N. of Gingin seismic shot hole B1 West Australian Petroleum Pty Ltd at 210, 220 ft.

DESCRIPTION: Shell circular to sub-circular in outline, wall membranous, thin, hyaline and delicate (sometimes partially destroyed) with a finely dotted surface. Capsule slightly longer than broad, untabulated, roughly hour-glass-shaped, the side walls deeply concave, the end walls straight or slightly concave one of the angles at the 'anterior' end being more prominent than the other three. Wall of capsule moderately thick and smooth, an opening has not been observed.

DIMENSIONS: Holotype—overall, 45 μ long, 40 μ broad; capsule 30 x 25 μ . Range—overall, 37-53 μ long; 32-52 μ broad.

COMMENTS: If the above interpretation of *Halophoridia xena* is correct, a comparison between it and the two Cretaceous genera *Diplo-testa* and *Trigonopyxidina* Cookson and Eisenack 1960(a) (b) at once suggests itself. On this basis the shells of all three agree in being partially filled by an inner capsule but whereas in *Diplo-testa* and *Trigonopyxidina* the shell membrane is relatively firm and cleanly outlined, in *H. xena* it is diaphanous, more indefinite in outline, and readily destroyed.

In the three figured examples of *H. xena*, a concave area suggestive of an opening can be seen at the so-styled anterior end of the shell. However, whether this represents a natural opening or is an artificial break cannot be decided at present. In *Diplo-testa* and *Trigonopyxidina*, the opening of the shell is effected by the removal of the end wall of one of the ends of the shell.

Genus *Horologinella* gen. nov.

DESCRIPTION: Shell small, slightly biconvex, roughly hour-glass-shaped with or without an opening at one end, surface with or without fields, smooth or sculptured.

TYPE SPECIES: *Horologinella lineata* sp. nov.

COMMENTS: The genus *Horologinella* is intended purely as a form genus without implication of any natural affinity between the individual types included in it. The two specimens from Carboniferous deposits in Alberta, Canada, described under the name *Azonotetraporina? horologia* by Staplin (1960, Pl. I, fig. 4, 6) and believed to be alete spores are reminiscent of some examples of *Horologinella*.

Horologinella lineata sp. nov.

(Pl. XXXVII, fig. 1-3; holotype, fig. 1-2; P21459)

AGE AND OCCURRENCE: ?Albian-Aptian: Attadale Bore, near Perth, W.A. at 619 ft.

DESCRIPTION: Shell approximately isodiametric divided by a relatively deep median incision on both sides into an epitheca and hypotheca of nearly the same shape. The epitheca bears a small beak-like projection adjacent to which in the mid-line lies a small, concave, terminal opening. The surface of the shell is tabulated, the arrangement and shape of the fields being different on the two surfaces which for convenience are distinguished as ventral and dorsal respectively. The ventral surface is characterized by a long field which narrows gradually from near the epithecal opening to the 'waist line' the remaining fields being polygonal in outline and variable in shape. The dorsal surface is divided into approximately 6 relatively large 4-5 sided fields. The wall of the shell is relatively thick and finely granular.

DIMENSIONS: Holotype— 30μ long, 25μ broad. Paratype (fig. 3)— 24μ long, 25μ broad; another example 22μ long, 23μ broad.

Horologinella apiculata sp. nov.

(Pl. XXXVII, fig. 4; holotype P21461)

AGE AND OCCURRENCE: Campanian: Brickhouse Bore (1950) 10 miles SE. of Carnarvon, W.A. at 455 ft.

DESCRIPTION: Shell small, without fields, approximately isodiametric, sides deeply and broadly concave, epitheca and hypotheca of almost the same size and shape, epitheca with a small median beak-like projection by one side of which a small concave opening is situated. Wall relatively thick, surface smooth.

DIMENSIONS: Holotype— 21μ long, 20μ broad.

Horologinella incurvata sp. nov.

(Pl. XXXVII, fig. 5; holotype P21462)

AGE AND OCCURRENCE: Probably lower Eocene: Rottnest Bore, W.A. between 1285 and 1385 ft.

DESCRIPTION: Shell small, without fields and apical projection approximately isodiametric with deeply concave sides, no opening observed. Wall relatively thick, surface smooth.

DIMENSIONS: Holotype— 16μ long, *c.* 16μ broad. Range of four examples— $16-17\mu$ long, $15-18\mu$ broad.

COMMENTS: *H. incurvata* has already been recorded from the Rottnest Bore between 1285 and 1385 ft by Churchill (1960, p. 493, fig. 1 (3)) under the general designation 'fossil algal aplanospores'. The additional examples in our own preparations from between 1480 and 1541 ft in the same bore provide no further information regarding the nature and affinity of this form.

Horologinella? extrema sp. nov.

(Pl. XXXVII, fig. 10; P21467)

AGE AND OCCURRENCE: Cenomanian: Upper Gearle Siltstone, Rough Range South No. 1 Bore, core 68 (2717-2725 ft).

DESCRIPTION: Shell thin-walled with one diameter longer than the other, two of the four sides convex the other two so deeply concave that the two halves of the

shell are only attached to one another by a narrow 'neck'. No opening has been observed.

DIMENSIONS: Holotype—30 x 52 μ , width of 'neck' 17 μ . Paratype—30 x 55 μ .

Horologinella? obliqua sp. nov.

(Pl. XXXVII, fig. 9)

AGE AND OCCURRENCE: ?Upper Albian to Cenomanian: N. of Gingin, W.A. Wapet's Seismic shot hole B1 at 200 ft.

DESCRIPTION: Shell longer than broad, side walls slightly concave upper and lower walls running slant wise, opening relatively large placed to one side of the mid-line. Surface finely granular.

DIMENSIONS: Length of shell 62 μ , width of epitheca 54 μ , opening c. 20 μ .

Horologinella sp. indet

(Pl. XXXVII, fig. 15)

AGE AND OCCURRENCE: ?Aptian-Tlbian: Attadale Bore, W.A., at 619 ft.

DESCRIPTION: Shell squarish, approximately isodiametric, antapical wall slightly concave, opening median, surface granular.

DIMENSIONS: Figured specimen 40 x 40 μ .

Palaeostomocystis sinuosa Cookson and Eisenack 1960

Palaeostomocystis sinuosa Cookson and Eisenack 1960, p. 258, Pl. 38, fig. 16, 17.

COMMENTS: The small shells described from Upper Jurassic deposits at Broome, W.A. under the name of *P. sinuosa* are almost certainly of the same category as *Horologinella*.

References

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Explanation of Plate

PLATE XXXVII

- Fig. 1-3—*Horologinella lineata* sp. nov. Attadale Bore, W.A. at 619 ft x c. 1300. 1, 2, ventral and dorsal surfaces of type; 3, dorsal surface of paratype.
- Fig. 4—*Horologinella apiculata* sp. nov. Brickhouse Bore at 455 ft x c. 650.
- Fig. 5—*Horologinella incurvata* sp. nov. Rottnest Bore, W.A. between 1480-1531 ft x c. 800.
- Fig. 6-8—*Halophoridia xena* sp. nov. 6, 8, Fremantle Traffic Bridge Bore No. 5 at 100 ft. 6, x c. 850; 8, x c. 57; 7, Power House Bore, W.A. at 478 ft.
- Fig. 9—*Horologinella? obliqua* sp. nov. Wapet's Seismic Shot Hole B1 at 200 ft x c. 400.
- Fig. 10—*Horologinella? extrema* sp. nov. Rough Range South Bore at 2717-2725 ft x c. 520.
- Fig. 11, 12—*Schizocystia rugoso* sp. nov. Fremantle Traffic Bridge Bore No. 5 at 100 ft x c. 530.
- Figs. 13, 14—*Schizocystia laevigata* sp. nov. Subiaco Bore at 358 ft (dark sample). 13, x c. 530; 14, x c. 520.
- Fig. 15—Affinity *Horologinella* sp. Attadale Bore, W.A. at 619 ft x c. 600.
- Fig. 16, 17—*Lecaniella margostriata* sp. nov. 16, Fremantle Traffic Bridge Bore No. 5, at 100 ft x c. 760; 17, Power House Bore, W.A. at 478 ft x c. 560.
- Fig. 18-20—*Lecaniella dictyota* sp. nov. 18, Power House Bore, W.A. at 640 ft x c. 540; 19, locality uncertain x c. 520; 20, Fremantle Traffic Bridge Bore No. 5 at 100 ft x c. 530.